Technology: Optoelectronics

Combined LD power on offer

Devices which can be used to couple power from several multimode laser diodes and deliver the combined power for use in applications in the industrial, medical, military and telecommunications markets comes from Canadian ITF Optical Technologies Inc

A new line of All-Fiber Multimode Combiners for use in laser diode combiners, fiber lasers and fiber amplifiers, offers a set of standard configurations: 7x1, 19x1 and (6+1)x1 combiners.

"Results demonstrate our in-depth knowledge of fused-fiber technology & component packaging important in the development of the multimode product line," says CEO Mervat Falta.

Ultraviolet for papers

Agfa has announced two new plate setters for the newspaper and commercial web printing sectors. The new violet laser base systems, to be introduced at Drupa trade show, will provide speed at 160 or 220 plates per hour. Using violet diodes, Agfa claims users have the lowest cost of ownership and exceed the industry's requirements for speed reliability and consistency.

3000 builds on 2000

Santur Corp has launched Series 3000 proucts, with increased miniaturisation and cost-reduction. They build on Santur's widely tunable, DFB array-based technology, designed in to transponders and linecards for metro and long-haul DWDM applications. Both products are capable of on-demand tunability across the C- or L-band, at CW power levels up to 20 mW.

Quantum dots available commercially

Evident Technologies laboratory

Evident Technologies claims to be is the first company to make commercially available a composite of quantum dots (semiconductor nanocrystals) in common polymers and matrix materials.

EviDot Composites enable the use of quantum dots in solid matrix materials that bridge the critical gap from the nano- to macro-worlds. Solid matrix materials allow product developers to control the form factor of the quantum dots and enable films, beads, fibers and micron-sized particles to be readily created. EviDot Composites are available in prepared films, optical mounts, a ultra-violet (UV) curable resin and as a custom order in common polymers, such as polycarbonate, polystyrene, PMMA, and sol-gels.

Unique to quantum dots is the ability to engineer the optoelectronic properties by changing the size and composition of the nanomaterials. Evident can tune the bandgap, photoluminescent, and electroluminescent properties of quantum dots by changing the size of and materials systems. Its quantum dot products are set to exacting quality standards, narrow photoluminescence line widths, high quantum yields, and precise peak wavelength emmissions.

Traditionally, these materials have been hazardous and expensive to produce, thus limiting their application. Evident has developed a proprietary method to safely produce high quality semiconductor nanocrystals in a broad range of sizes and materials.

Dr. Clinton T. Ballinger, CEO of Evident Technologies says: "Quantum dots are a scientific curiosity unless they can be functionalised and brought to a scale where they can be applied. By making these composites available, we are accelerating our customer's applications in reference standards, photonics, LEDs, ink and paints."

Work on THz moves to QDs

Yujie Ding, professor of electrical and computer engineering and a member of Lehigh University's Center for Optical Technologies, is working to make THz devices readily accessible and cost-effective. "We need a source to generate coherent THz waves and we need detectors," says Ding, a specialist in optoelectronics, nonlinear optics and quantum electronics. "This is very challenging because the concepts that govern infrared light and visible light don't work with THz."

Ding hopes to develop a compact THz radiation source, with wide tunability in the wavelength range of 30 to 3,000 microns. Several methods have been advanced by other researchers, but most have shortcomings. Free-electron lasers are bulky and costly. Ultrafast lasers generate very weak THz beams with low output powers and pulse energies. Ding and his research group have developed a method of focusing two high-frequency lasers to generate tunable and coherent THz waves in the range of 58 to 3540 microns in zinc germanium phosphide ZnGeP2. Last year, he reported successful THz radiation using gallium-selenide crystals

Because vibrations of DNA and RNA chains resonate in THz, Ding says, "with a proper THz radiation source, you can tune across the resonances and sense very slight changes of the atomic chain arrangement." Cancer cells, especially melanoma tissues, also vibrate in THz, he says, and lend themselves to early detection by doctors equipped with THz devices.

His next work is to scale down his THz radiation device, a large shoe box in size, with an ultimate goal of 10 arrays, each equipped with an emitter, a detector and photonic bandgap crystals, and each measuring millimeters onto one computer chip wafer of standard dimensions.

To miniaturise his THz device, Ding is using nanostructure quantum dots and including photonic bandgap crystals that act as a special waveguide by tightly focusing the THz beam on a particular detector. The result is a more sensitive detecting tool, that detects the presence of a specific toxic chemical when that chemical blocks part of the THz beam. "Without the photonic bandgap crystals, the beam will diverge," he says.